

Radiotekhnika, 11, fasc.10, 79-80 (1956)

CARD 2 / 2

PA - 1599

VERBICKAJA spoke about new types of nonlinear condenser variconds and the range of their application, as i.e. as dielectric amplifiers, in voltage stabilizers, frequency modulators, and similar devices.

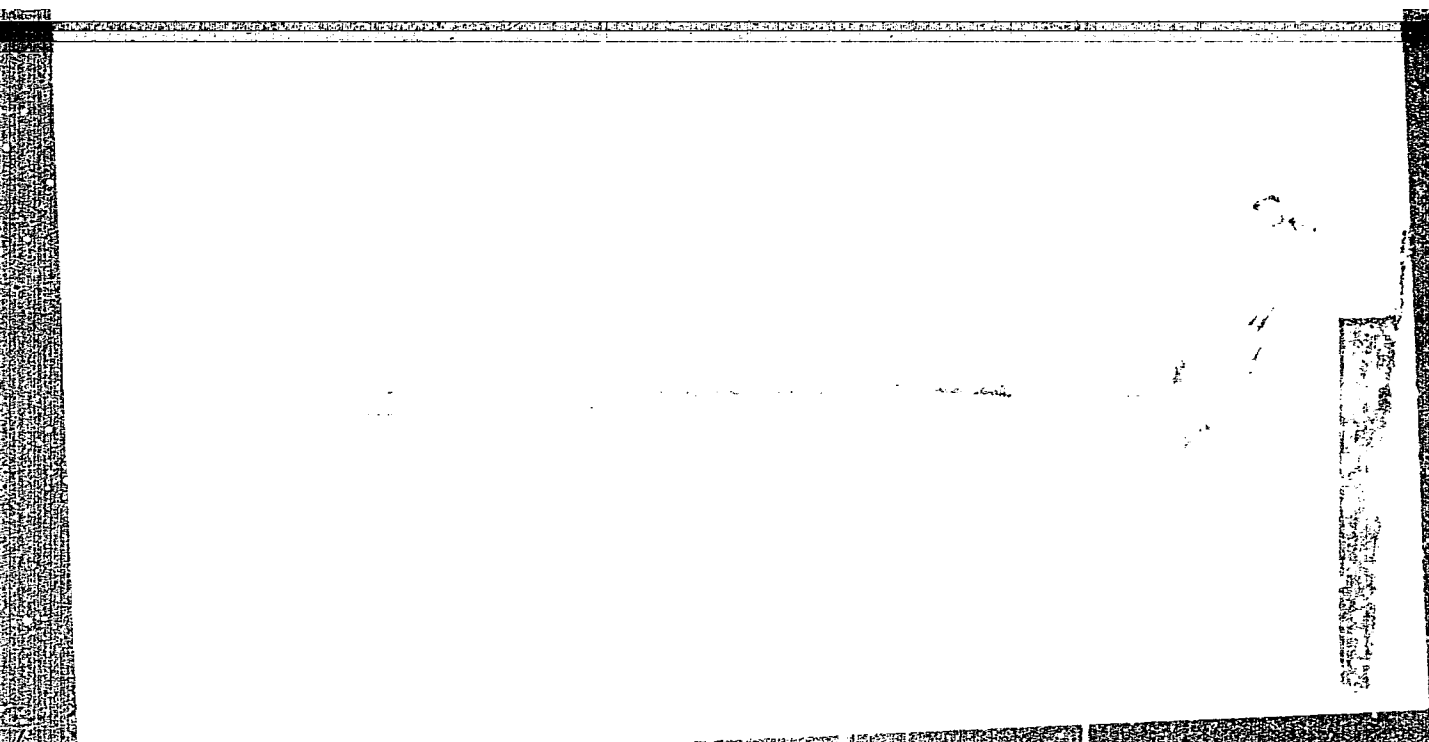
OREŠKIN delivered a report on thermistores at high temperatures. He pointed to the possibility of using thermistores of aluminium, oxide, magnesium, and some other materials.

A large number of lectures was devoted to ferrites.

INSTITUTION:

"APPROVED FOR RELEASE: 09/01/2001

CIA-RDP86-00513R001859420008-4



APPROVED FOR RELEASE: 09/01/2001

CIA-RDP86-00513R001859420008-4"

BOGORODITSKIY, N.P.; VERBITSKAYA, G.N.

Electric properties of ferroelectric ceramics near the Curie point. Zh.  
Tekh. Fiz. 22, No.12, 1920-9 '52. (MLA 6:2)  
(EEA 56 no.670:4010 '53)

VERBITSKAYA, I.D.

Mechanization of loading, unloading and mechanical operations  
in the liming shops. Kozh.-obuv. prom. 6 no.4:34-35 Ap'64.  
(MIRA 17:5)

VERBITSKAYA, I.N. (Glasa)

Conditions for applying the strong law of large numbers to  
processes stationary in a broad sense. Teor. veroiat. i ee  
prim. 9 no. 3458-364 1961 (MIRA 1961)

S/044/62/000/006/062/127  
B168/B112

AUTHORS: Bobrov, A. A., Verbitskaya, I. N.

TITLE: One inequality for the correlation function of a random process steady in a wide sense and its application to the ergodic theorem

PERIODICAL: Referativnyy zhurnal. Matematika, no. 6, 1962, 6, abstract 6V29 (Nauchn. yezhegodnik, Odessk. un-t. Fiz.-matem. fak. i N.-i. in-t fiz., Odessa, no. 2, 1961, 79-82)

TEXT: Let us assume that  $B(\tau)$  be the correlation function of a process  $\xi(t)$  which is steady in a wide sense. The inequality

$$2 \left( \int_0^T B(\tau) d\tau \right)^2 \leq \int_0^{2T} dt \int_0^t B(\tau) d\tau$$

is proved. With the aid of this inequality the well-known ergodic theorem is proved: If  $\xi(t)$  is a process steady in a wide sense and  $M\xi(t) = 0$ , then, in order that the limit

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One inequality for the correlation...

S/044/62/000/006/062/127  
B168/B112

$$\lim_{T \rightarrow \infty} \frac{1}{T} \int_0^T \xi(t) dt$$

(understood as the limit in the mean square) be equal to zero, it is necessary and sufficient that

$$\lim_{T \rightarrow \infty} \frac{1}{T} \int_0^T B(\tau) d\tau = 0.$$

An analogous statement is also proved for a process with discrete time.  
[Abstracter's note: Complete translation.]

Card 2/2

KOSHNIITSKIY, I.N., dotsent; KRICHKOVSKIY, G.F.; VERBITSKAYA, L.P.,  
dotsent; LYSENKO, N.I.; BIRBRAYER, M.L.; ALENGOZ, N.G.;  
LOKHMATOV, D.P.; YAROSHCHUK, A.A.

State of health of workers in the graphite industry. Vrach.  
delo no.8:134 Ag'63. (MIRA 16:9)

1. Odesskiy meditsinskiy institut.  
(NO SUBJECT HEADINGS)



VERBITSKAYA, L.P., dotsent

Normal gastric position and form in children of various ages  
in roentgenological representation. *Pediatrics* 38 no.10:55-  
59 0 '60. (MIRA 13:11)

1. Iz kafedry rentgenologii i radiologii (zav. - prof. Ye.D.  
Dubovyy) Odesskogo gosudarstvennogo meditsinskogo instituta imeni  
N.I. Pirogova (dir. - prof. I.Ya. Deyneka).  
(STOMACH--RADIOGRAPHY)



VERBITSKAYA, L.P., kandidat meditsinskikh nauk

X-ray diagnosis of pulmonary air cysts. Vrach.delo no.11:1159-1162  
N 156. (MIRA 10:3)

1, Kafedra rentgenologii i radiologii (zaveduyushchiy - professor  
Ye.D.Dubovyy) Odesskogo meditsinskogo instituta.  
(CYSTS) (LUNGS--RADIOGRAPHY)

VERBITSKAYA, L.P., dotsent; STUDZINSKAYA, Ye.A.; GORNOVSKAYA, G.I.

Comparative roentgenkymographic observations on the influence of  
eryside, erysimine, and strophanthin on the cardiovascular system  
of patients with circulatory insufficiency. Vrach.delo no.3:239-  
241 M<sub>r</sub> '60. (MIRA 13:6)

1. Kafedra rentgenologii i radiologii (zav. - prof. Ye.D. Dubo-  
vyy) i kafedra fakul'tetskoy terapii (i.o.zav. - dotsent V.S.  
Balaban) Odeskogo meditsinskogo instituta.  
(CARDIAC GLYCOSIDES) (BLOOD--CIRCULATION, DISORDERS OF)  
(HEART--RADIOGRAPHY)

VERBITSKAYA, N.G.; IL'YUNINA, N.P.; KOVBASINA, V.M.

Stratigraphy and lithology of upper Paleozoic coal-bearing sedi-  
ments in the southwestern margin of the Tunguska Basin. Mat.-  
VSEGEI Ob.ser. no.23:112-137 '59. (MIRA 14:11)  
(Tunguska Basin--Coal geology)

3(8)

SOV/132-59-3-3/15

AUTHORS: Verbitskaya, N.P., and Gapeyeva, G.M.

TITLE: On the Potential Diamond Origins in the Diamond Fields of the West-Sloped Urals

PERIODICAL: Razvedka i okhrana nedr, 1959, Nr 3, pp 8-12, (USSR)

ABSTRACT: The authors point out that several new diamond deposits have been discovered in the above-mentioned region during the last years (on the rivers Ai, Belaya, Yurezan', etc.), but proved to be too small to be exploited on an industrial scale. This critical state of affairs is partly due to the divided state of opinion of Soviet scientists on the diamond deposits, with several schools of thought being in existence. Thus, N.K. Vysotskiy, A.A. Kukharensko, V.S. Trofimov, S.V. Moskaleva, and others maintain that there is a close connection between the diamonds found in the west-sloped Urals and the ultra-basic rocks of the platinum-bearing strata of that mountain part. This is best illustrated in the geological scheme of the Central and South Urals (see page 9). Another group of scientists

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SOV/132-59-3-3/15

On the Potential Diamond Origins in the Diamond Fields of the West-Sloped Urals

(G.V. Pisenskiy, N.V. Vvedenskaya, A.V. Khabakov, and V.A. Dargevich) hold that the diamond deposits might derive from Paleozoic rocks representing secondary diamond-bearing collectors. The authors give preference to the first-mentioned opinion and furnish the following proof: the lower Paleozoic rocks occurring in that area - Ordovician and Ashinskaya formations - contain such minerals as garnets of the pyrope series and microscopic particles of diamonds. The latter were found on the Sidorova Mountain, Visimskiy rayon, and along the Serebryanka river, near the Kedrovka Settlement, with VSEGEI and TsNIGRI institutes carrying out research work in those areas. In addition to this, the following scientist names are cited in this article: K.F. Springs, P.I. Kratoch, Yu.D. Smirnov, Yu.L. Orlov, and Mineralogist M.T. Orlova. There are 1 map and 3 Soviet references.

ASSOCIATION: VSEGEI  
Card 2/2

AUTHORS: Gapeyeva, G. M., Verbitskaya, N. P. SOV/20-122-2-32/42

TITLE: Eruptive **Hyperbasite** Breccia of the Southern Urals (Eruptivnaya giperbasitovaya brekchiya Yuzhnogo Urala)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 122, Nr 2, pp 281 - 283 (USSR)

ABSTRACT: In the fall of 1956, S.V. Moskalova, while studying the **hyperbasite** masses of Yuzhnyy Krak, discovered an eruptive **hyperbasite** breccia in the bed of the Sukhoy Uzyan River near the confluence of the Belaya Rivers. At that time, however, the scientific value of the discovery was not appreciated and the outcrop was not carefully studied to determine the nature of the breccia, i.e. whether it was actually an eruptive rock or merely cemented river gravels. In 1957 no information from borings was obtained, but the mine workings in the area, in spite of their insignificant depth, afforded useful observations. The principal breccia outcrop occurs in the bed of the Sukhoy Uzyan River near the mouth of the Myslyayevskiy Spring, where on the walls of the abruptly widened valley the **hyperbasite** rock of the Southern Krak Massif is exposed. The breccia is covered by

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Eruptive Hyperbasite Breccia of the Southern Urals

SSV/20-122-2-35/42

alluvium and soil varying in thickness from 0 to 0.75 m. It forms a lens-like body of irregular outline (170 x 70 m) everywhere in contact with a non-cemented riverbed—marble. The exposed breccia in the river bed is structurally irregular. It consists of firm, greyish yellow masses, primarily composed of weathering products, carbonates with lesser amounts of serpentine and nontronite, yet still rich in **hyperbasite** fragments. Sorting of the fragments by the river is not pronounced though they are to some extent differentially rounded. Microscopically the breccia is composed predominantly of **hyperbasite** rock, but the difficult-to-ascertain mineral composition hinders determination of the genesis. However, the river bed gravels in contact with the breccia lack rocks of extrusive appearance. The possibility of an eruptive ultrabasic breccia on the western side of the Ural must be considered from the standpoint of the general geology. The wide dispersal of diamonds along the western flank of the Urals testifies to the nearness of their source. Diamonds are known to occur in Kimberlite, a type of **hyperbasite** breccia. The heterogeneous structure of the western and eastern

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Eruptive **Hyperbasite** Breccia of the Southern Urals

SOV/20-122-2-32/42

zones of the Urals (Refs 1,2) indicates that theories including them both in one fold system are poorly founded. The western zone is not a folded geosynclinal structure but the **edge** of the craton. Thus the occurrence of an extrusive **hyperbasite** breccia is possible from general geologic considerations. There are 2 references, 2 of which are Soviet.

ASSOCIATION: Vsesoyuznyy nauchno-issledovatel'skiy geologicheskii institut  
(All-Union Scientific Geologic Research Institute )

PRESENTED: April 14, 1958, by D.S.Korzhinskiy, Member, Academy of Sciences, USSR

SUBMITTED: April 11, 1958

Card

VERBITSKAYA, N.P.

Characteristics of the structure and the history of the development  
of river valleys in the western slope of the Southern Ural Mountains.  
Mat. VSEGEI Chet. geol. i geomorf. no. 4:239-269 '61. (MIRA 17:5)

VERBITSKAYA, N.P.

Stratigraphy and lithology of alluvial sediments of diamond-bearing  
regions on the western slopes of the Central Urals. Mat. VSEGEI.  
Chet. geol. i geomorf. no.2:96-113 '59. (MIRA 14:5)  
(Ural Mountains—Geology, Stratigraphic)

VERBITSKAYA, O. A., Candidate Tech Sci (diss) -- "The effect of leakage on the distribution of pressure in the side chambers of a centrifugal pump". Moscow, 1959. 18 pp (Min Higher Educ USSR, Moscow Order of Lenin Power Engineering Inst), 150 copies (KL, No 23, 1959, 165)

AUTHORS: Syskov, K. I., Verbitskaya, O. V. SOV/32-24-10-20/70

TITLE: A Pycnometric Method for the Determination of the Apparent Specific Gravity of Coke (Piknometricheskii metod opredeleniya kazhushchegosya udel'nogo vesa koksa)

PERIODICAL: Zavodskaya Laboratoriya, 1958, Vol 24, Nr 10, pp 1224 - 1226 (USSR)

ABSTRACT: The apparent specific gravity usually is determined according to the volume of the weighed sample or according to the weight of the displaced fluid. The present method is based upon the direct reading of the values of the apparent specific gravity on the scale of a respectively graded pycnometer. A figure showing the pycnometer with the grading, and a description of the mode of operation are given. In the case of samples of equal weight and constant volume of the fluid contained in the pycnometer the level in the neck of the pycnometer will only depend on the amount of the apparent specific gravity of the coke. If the quantity of fluid is changed the volume computation can be applied for any interval of the apparent specific

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A Pycnometric Method for the Determination of the  
Apparent Specific Gravity of Coke

SOV/32-24-10-20/70

gravity. In the description of the method of measuring it is mentioned that for coke of the dimension 6 - 13 mm which has been sifted and subjected to a determination of the moistness and to drying, 50 g can be taken with an accuracy of  $\pm 0,01$  g. To judge the described method comparative determinations according to the paraffin method (Ref 1) and to the method by Ye.M.Tayts (Ref 2) were carried out; the results are given in tables. The investigations on the reproducibility showed that the standard deviation amounts to 0,0031. There are 1 figure, 2 tables, and 2 references which are Soviet.

ASSOCIATION: Institut goryuchikh iskopayemykh Akademii nauk SSSR  
(Institute of Mineral Fuels, AS USSR)

Card 2/3

A Pycnometric Method for the Determination of the  
Apparent Specific Gravity of Coke

SOV/32-24-10-20/71

Card 3/3



KANAVETS, P.I.; VERBITSKAYA, O.V.

Investigating processes of carbonisation and hardening  
of fluxed ore-fuel granules. Trudy IGI 22:35-38 '63.  
(MIRA 16:11)

68-58-7-9/27

AUTHORS: Verbitskaya, O. V., Candidate of Technical Science and  
Syskov, K. I., Doctor of Technical Science

TITLE: On Thermal Stability of Coke (O termicheskoj ustoychivosti  
koks) )

PERIODICAL: Koks i Khimiya, 1958, Nr 7, pp 30-33 (USSR)

ABSTRACT: The ability of lumps of coke to withstand destruction during heating to high temperatures is called the thermal stability of coke. The results of investigation of thermal stability of 10 samples of coke produced on the Kharkov coke oven works during experimental coking is described. The composition of experimental blends and their coking conditions are given in Table 1. The method of investigation was as follows: from 60-40 mm fraction of each coke type two samples were made from the same number of pieces of the same degree of readiness and of approximately the same degree of surface fissuring. One of each pair of samples was heated to 900°C at a rate of 10°/min and from 900 to 1400°C at a rate of 5°/min. At 1400°C the sample was soaked for 30 min. During heating, air was excluded by an 80-100 mm high layer of a carbonaceous material placed on top of the furnace

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On Thermal Stability of Coke

63-52-7-9/27

cover. Changes in the following factors before and after heating of each coke sample were measured: size distribution, surface fissuring, shrinkage and strength of coke (Tables 2 and 3). It was found that: the number of lumps in a sample after heating did not change, the degree of surface fissuring of the majority of cokes did not increase and linear shrinkage after reheating to 1400°C was not observed. The strength of coke was determined by dropping it onto a plate from a height of 1.8 m with subsequent screening into 50, 40, 25, 10 and 5 mm fractions after 2, 4, 8 and 12 droppings. It was found that a decrease in the mean diameter of coke due to thermal action was insignificant in comparison with changes caused by mechanical action. Changes in the mean coke size on heating were somewhat higher for cokes made from blends containing non-caking components. The strength of the coke material itself (free from fissure) after reheating generally increases. There were two exceptions in which it somewhat decreased. The hardness of the coke material increased after heating in all cases. As one of the possible factors causing some differences in the

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On Thermal Stability of Coke

68-58-7-9/27

behaviour of various cokes on reheating could be the differences of the expansion coefficients of blend components, the linear expansion of specimens of laboratory coke produced from various types of coals at 1000°C was measured. On the basis of the value of linear expansion at 900°C and of the mean coefficient of linear expansion in the temperature range 0 - 900°C the cokes studied were divided into 4 groups (Table 4). The mean coefficient of linear expansion in the extreme cases differed by a factor 5-7. Thus, the value of stresses appearing in coke on secondary reheating depends on the differences in the expansion coefficients of the individual components of the blend. By finer grinding of high ash and non-caking components of a blend, the value of stresses generated on reheating can be reduced. The nature of fissuring depends strongly on the rate of reheating. The influence of the rate of reheating was demonstrated on laboratory samples of semi-coke obtained from various coal types at 500°C. Samples were divided into pairs and one of each pair was heated at a rate of 3°/min while the other one was shock heated by placing it

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On Thermal Stability of Coke

68-58-7-9/27

into a furnace heated to  $1350^{\circ}\text{C}$ . It was found that the appearance of fissuring and its extent in the same coke specimen depended on the rate of heating (Fig.). Shock heating of industrial cokes caused in all cases the appearance of new fissures. Conclusions: Thermal stability of coke is determined to a considerable extent by the relationship of two factors: the strengthening process of the coke substance itself, which has a positive effect on the preservation of its size, and weakening of lump coke due to the formation of micro and macro cracks which lead to a change in its size distribution. In respect of thermal stability cokes can be divided into two groups of a higher and lower thermal stability, associated with monolithic and conglomerate structure of coke respectively. Heating of coke samples to  $1400^{\circ}\text{C}$  indicated that the thermal destruction of coke is insignificant in comparison with its destruction by mechanical forces and therefore differentiating of monolithic cokes according to their thermal stability is of no practical importance for the

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On Thermal Stability of Coke

68-58-7-9/27

blast furnace process.

There are 4 tables and 1 figure.

ASSOCIATION: IGI AN SSSR

1. Coke--Thermal properties

Card 5/5

SYSKOV, K.I.; VERBITSKAYA, O.Y.

Pycnometric method of determining apparent specific gravity of  
coke. Zav.lab. 24 no.10:1224-1226 '58. (MIRA 11:11)

1. Institut goryuchikh iskopayemykh AN SSSR.  
(Pycnometer) (Coke)

VERBITSKAYA, O.V.; SYSKOV, K.I.

Comprehensive investigation of shrinkage and liberation of volatile  
matter in the thermal treatment of carboniferous materials. Trudy IGI  
8:229-238 '59. (MIRA 13:1)  
(Coal--Carbonization)



VERBITSKAYA, O. V.

Production Methods

Dissertation: "Investigation of the Effect of a Method for Heating Coals and Oven Charges on the Physicomechanical Properties of Coke." Cand Tech Sci, Inst of Mineral Fuels, Acad Sci USSR, Oct-Dec 1953. (Vestnik Akademii Nauk Moscow, No 3, 54)

SO: SUM, 213,,20 Sep 1954

VERBITSKAYA, O.V.; PUT'KO, Yu.S.; SYSKOV, K.I.

Crushing of coal for coking. Koks i khim. no.1:18-21 '61.  
(MIRA 14:1)

1. Institut goryuchikh iskopayemykh AN SSSR (for Verbitskaya,  
Put'ko). 2. Moskovskiy khimiko-tekhnologicheskii institut im.  
Mendeleeva (for Syskov).  
(Coal preparation)

VERBITSKAYA, S.N.

Investigation of low clouds in the zone of fronts passing over the  
region of Vnukovo during the cold part of the year. Sbor. po reg.  
sin. no.4:53-63 '70. (MIRA 14:11)  
(Vnukovo region--Clouds)

VERBITSKAYA, T.; KUL'TSEP, V.

Low-frequency amplifiers and frequency modulators made with  
"varikond" dielectrics Radio no. 11:55-56 N'55. (MLRA 9:1)  
(Dielectrics)

VERBITSKAYA, T.D., ROMANOVA, N.K.

Determination of hypophosphite and phosphite in the  
presence of phosphate. Zav.lab. 26 no.7:818-820 '60.  
(MIRA 13:7)

(Hypophosphite) (Phosphite) (Phosphate)

KORETMAN, I.M.; VERBITSKAYA, T.D.

Coprecipitation of bivalent tin with cadmium hydroxide.  
Trudy po khim.i khim.tekh. no.1:113-117 '64.

(MIRA 18:12)

1. Submitted June 28, 1963.

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VERBITSKAYA, T. N.

USSR/Physics - Piezoelectric Ceramics  
Polytropic Flow

Dec 52

"Letters to the Editor"

"Zhur Tekh Fiziki" Vol 22, No 12, pp 2061-2066

S. V. Romanenko: "Concerning A. L. Klaychkin's article Polytropic Gas Flow" (ZhTF 21,9, 1951). T. N. Verbitskaya: "Concerning Piezoelectric Ceramics."

PA 240T107



VERBITSKAYA, T.N.

B. T. R  
Vol. 3 No. 4  
Apr. 1954  
Ceramics and Concrete

3  
② 1118  
4445 On the Behavior of Ferroelectrics Near the Curie Point. N. P. Bogoroditsky and T. N. Verbitskaya. *National Science Foundation Translation*, no. 44, Aug. 1953, 3 p. (Original in *Doklady Akademii Nauk SSSR*, v. 89, 1953, p. 447.)  
Change of dielectric constant from original value reaches 30 to 35% and occurs mainly in first 30 to 40 days after preparation of samples. Graphs.

ME  
7-14-54

constant field; the capacities corresponding to these reversible

112-3-5159

Translation from: Referativnyy Zhurnal; Elektrotehnika, 1957, Nr 3, p. 12 (USSR)

AUTHOR: Verbitskaya, T. N., Yermolina, L. M., Kul'tsep, V. P., Obukhov, A. A.

TITLE: Basic Properties of "Varikonds" (Osnovnyye svoystva varikondov)

PERIODICAL: Inform.-tekhnich. sb. M-va radiotekhn. prom-sti SSSR, 1955, Nr 9-10, pp. 3-29

ABSTRACT: In comparing the dependence of the specific inductive capacitance  $\epsilon$  of four seignetto-electrics upon the intensity of the variable field, it is found that "Varikond"  $\beta K-1$  has a greater dependence and higher maximum value of  $\epsilon$  than barium titanate (according to the data of B.M. Vul) and the seignetto-ceramic T-7500 (developed under the supervision of N.P. Bogoroditskiy); in this connection, "Varikond"  $\beta K-1$  is second only to Rochelle salt. The curve of reversible  $\epsilon$  as a function of the intensity of the constant displacement field has the maximum slope at the value of the alternating voltage which corresponds to the maximum in the  $\epsilon$ -variable field relationship; the re-

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Basic Properties of "Varikonds" (Cont.)

112-3-5159

versible  $\epsilon$  is decreased by 4-5 times when the intensity of the constant field is changed from zero to 3 kv/cm. With high variable field intensity, the specific inductive capacitance  $\epsilon$  of "Varikond" changes by  $\pm 20\%$  with a temperature change within the limits of  $-60... + 80^\circ$ . With an increase in the alternating voltage from 5 to 30 volts, the capacitance of a capacitor made of  $\beta K-1$  changes by a factor of 2.5 to 3. The capacitors have the shape of disks; the capacitor with the least capacitance (200  $\mu\mu$  farads) is in the form of a bead. The authors consider that "Varikonds" have the following possible applications: frequency multiplication and division; obtaining pulses from a sinusoidal voltage source; voltage regulation; limiting and detection; current regulation; frequency modulation; phase inverters; and dielectric amplifiers.

Sixteen bibliographic entries.

D.M.K.

ASSOCIATION: Ministry of Radio Engineering of the USSR (M-vo radio-tekhn. prom-st. SSSR)

Card 2/2

Verbitskaya, T. N.

1 kV

The permittivity of Varikon VK-1 increases from 4000 to a  
maximum of 20000 under 0.5-0.7 kV per cm at 1000 c/s  
VK-1 has been used in a tubeless audio-frequency amplifier  
to obtain amplification factor of 5000

J. Lukaszewicz

PM

4241/20-77, 78.  
VERBITSKAYA, V. N.

"Nonlinear Properties of Piezoelectric Ceramics," pp. 317-322, 411,  
5 ref

Abst: The author reviews the characteristics of piezoelectric ferroelectric materials which have attained the greatest importance in technology (barium titanate, T-1700 and T-7500 materials, and the varicord VK-1). It is pointed out that these materials have wide application in the radio technology industry, automation, and telecommunications.

SOURCE: Izvestiya Torskogo Politekhnikn. In-ta. S. M. Kirova (Near of the Torsk Polytechnic Institute named S. M. Kirov), Volume 91, "Works of the Conference on Solid Dielectrics, Torsk, September 1955, Torsk, Publishing House of the Polytechnical Institute, 1956

Sum 1854

VEKHTSKAYA, I. A.  
USSR/Electricity - Dielectrics

G-2

Abs Jour : Ref Zhur - Fizika, No 3, 1957. No 6970

Author : Vorbitskaya, T.N.

Title : Variconds

Orig Pub : Elektrichestvo, 1956, No 6, 90-92

Abstract : Report on the conference held in Leningrad in March 1956 and organized by the Scientific Research Institute of the Ministry of Radio Industry and devoted to the electric properties and applications of nonlinear ferroelectric materials -- variconds.

Card : 1/1

Category : USSR/Electricity - Dielectrics

G-2

Abs Jour : Ref Zhur - Fizika, No 1, 1957 No 1532

Author : Verbitskaya, T.N.

Title : Nonlinear Properties of Ferroelectrics

Orig Pub : Izv. AN SSSR, ser. fiz., 1956, 20, No 2, 185-194

Abstract : Discussion of the variation of the dielectric constant of Rochelle salt,  $\text{BaTiO}_3$ , T-7500 material, and Varikond VK-1 with the intensities of the variable and constant fields at normal temperatures T. The nonlinear properties of Varikond VK-1 are studied for three different values of T:  $+60^\circ$ ,  $+20^\circ$ , and  $-60^\circ$ , while the function  $\epsilon(T)$  is studied in the temperature range from  $-60^\circ$  to  $+60^\circ$ , and under the conditions created by a changeover from weak fields (approximate 10 kV/cm), given. The average value of  $\epsilon$  in the range from  $(-60)$  to  $(+60^\circ)$  is close to 16,000, and no intermediate value differs by more than 20% from the average value. It is established that Varikond is a ferroelectric with a strongly-pronounced nonlinear properties down to  $T = -195^\circ$ . Many applications of ferroelectrics as nonlinear elements for electric circuits are mentioned.

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Card : 1/1



9 (2)

SOV/112-59-1-147

Translation from: Referativnyy zhurnal. Elektrotehnika, 1959, Nr 1, p 16 (USSR)

AUTHOR: Verbitskaya, T. N.

TITLE: Electrical Characteristics of Variconds and Their Application in Dielectric-Type Power Amplifiers

PERIODICAL: Tr. 1-y Mezhvuzovsk. konferentsii po sovrem. tekhn. dielektrikov i poluprovodnikov, 1956, L., 1957, pp 47-56

ABSTRACT: Characteristics of commercial variconds are reported (see SOV/112-59-1-146). Developing the dielectric amplifiers helps to solve a number of problems in automatic-control technique. A differential dielectric amplifier for a DC followup drive has been developed by Yu. S. Volkov; its output power drops to one-half with a temperature rise to +60°C or fall to -40°C. N. L. Khudobko has investigated a dielectric-type power amplifier controlled by a transistor-type amplifier. A dielectric amplifier for an AC followup system developed by V. K. Andriatis has an error-angle sensitivity

Card 1/2

SOV/112-59-1-147

Electrical Characteristics of Variconds and Their Application in Dielectric-. . . .  
of  $1^0$ . The dielectric-type power amplifiers may have a very high amplification  
factor, up to  $10^6$ . Of particular interest is a combination of transistor-type  
and dielectric-type amplifiers.

D.M.K.

Card 2/2

9 (2)

SOV/112-59-1-146

Translation from: Referativnyy zhurnal. Elektrotehnika, 1959, Nr 1, p 16 (USSR)

AUTHOR: Verbitskaya, T. N., Aleksandrova, L. M., Kul'tsep, V. P., and  
Obukhov, A. A.

TITLE: Ferroelectric-Ceramic Capacitors or Variconds

PERIODICAL: Radiotekhn. proiz-vo, 1957, Nr 12, pp 3-17

ABSTRACT: Ferroelectric capacitors (variconds) made of type VK-1 ceramic  
have the following fundamental characteristics:

Card 1/3

SOV/112-59-1-146

Ferroelectric-Ceramic Capacitors or Variconds

Capacitor type	Capacitance, $\mu\text{uf}$	Voltage, volts		Diameter, mm
		DC	AC 50 cps	
VK1-0	100	250	160	1.6
VK1-1	510	250	160	4
VK1-1	1,500	250	160	4
VK1-2	2,700	250	160	9
VK1-2	5,100	250	160	9
VK1-3	6,800	250	160	16
VK1-3	$1.2 \times 10^4$	250	160	16
VK1-B	$1.5 \times 10^5$	300	160	25
VK1-B	$2 \times 10^5$	300	160	25

Card 2/3

SOV/112-59-1-146

**Ferroelectric-Ceramic Capacitors or Variconds**

The capacitor capacitance can deviate from its rated value +100%, -40%; the ratio of the capacitance at 80-150 v to the capacitance at 5 v is 4 or more. The insulation resistance of VK1-B is  $10^9$  ohms, that of other types, higher. For each type of capacitor, a voltage can be selected at which the capacitance changes but little within a certain temperature range. Four-electrode capacitors having the shape of a parallelepiped can be used for ultrashort waves; one pair of electrodes is fed with DC, another pair with AC. The capacitor mechanical strength is secured by a resinous or plastic sheathing. For low voltages, a film-type capacitor with 0.2-mm dielectric can be used. The above nonlinear capacitors can be used for dielectric amplifiers, frequency multipliers, pulse generators, voltage stabilizers, etc.

D.M.K.

Card 3/3

20-114-3-23/60

AUTHOR: Verbitskaya, T. N.

TITLE: An Investigation of the Electrostriction of Seignette Ceramics  
(Issledovaniye elektrostriksii segnetokeramiki)

PERIODICAL: Doklady Akademii Nauk SSSR, 1957, Vol. 114, Nr 3, pp. 533-536 (USSR)

ABSTRACT: The present paper investigates the properties of barium titanate and of 4 materials (number 1 - 4) which were obtained on the basis of the solid solutions  $Ba(Ti, Sn)O_3$ . The content of barium titanate in these solutions amounts to at least 85 molecular percent. The Curie temperature decreases with an increasing content of Sn-ions in these solid solutions. The author investigated the electrostriction of these solid solutions in two manners. In the first method the change of the length of the samples caused by the application of a constant polarizing field was determined at room temperature and at some given temperature values. In the second method the relative extension of the sample due to its heating with and without application of an electric field was measured. The difference of the values thus obtained made it possible to draw conclusions as to the amount of the electrostriction of

Card 1/3

20-114-3-23/60

An Investigation of the Electrostriction of Seignette Ceramics

Seignette electrics in a wide temperature interval. The variation range of temperature extended from  $+20^{\circ}$  to  $+150^{\circ}$ . The experiments are shortly described. Upon application of a constant electric field a shortening of the samples was observed in the case of all compositions, which is illustrated by a diagram. The deformation of ceramics due to electrostriction depends on the duration of action of the field. Immediately after turning on the voltage, the length of the sample changes and thereafter the speed of this change decreases. Due to electrostriction an anomaly of the coefficient of thermal expansion near Curie point is observed in Seignette electrics. The coefficients of the linear expansion are not equal above and below Curie point. The connecting of a displacing constant field reduces the dielectric constant of a Seignette electric. A constant electric field increases the coefficient of the linear extension of the sample in the Seignette-electric domain. Materials with a Curie point of  $80^{\circ}\text{C}$  and more are best suited for Seignette-ceramic nonlinear elements which are produced of the materials discussed here. There are 2 figures and 7 references, 6 of which are Slavic.

Card 2/3

An Investigation of the Electrostriction of Seignette Ceramics 20-114-3-23/60

PRESENTED: December 17, 1956, by A. F. Ioffe, Member of the Academy

SUBMITTED: October 31, 1956

Card 3/3



VERBITSKAYA, Tat'yana Nikolayevna; ZAKHAROV, K.D., red.; DMITRIYEVA, T.I.,  
otv. za vypusk; SUKHAREVA, R.A., tekhn.red.

[Manufacturing technology and characteristics of variconds]  
Tekhnologiya izgotovleniya varikondov i ikh svoistva. Moskva,  
1958. 34 p. (Moskovskii Dom nauchno-tekhnicheskoi propagandy.  
Poredovoi opyt proizvodstva. Seriya: Radiopriborostroenie,  
vyp. 9). (MIRA 13:11)

(Electric capacitors)

9(2)

PHASE I BOOK EXPLOITATION

SOV/2668

Verbitskaya, Tat'yana Nikolayevna

Varikondy (Varicaps) Moscow, Gosenergoizdat, 1958. 61 p. (Series: Massovaya radiobiblioteka, vyp. 318) 40,000 copies printed.

Ed.: I.P. Zherebtsov; Tech. Ed.: G.Ye. Larionov; Editorial Board of Series: A.I. Berg, V.A. Burlyand, V.I. Vaneyev, Ye.N. Genishta, I.S. Dzhigit, A.M. Kanayeva, E.T. Krenkel', A.A. Kulikovskiy, A.D. Smirnov, F.I. Tarasov, and V.I. Shamshur.

PURPOSE: This booklet is intended for radio amateurs with some background in radio engineering. It may be also useful to engineers and technicians working with electrochemical and radio equipment

COVERAGE: The booklet contains basic information on Rochelle salt and other ferroelectric crystals, and describes the characteristics and constructional features of ferroelectric-ceramic capacitors with pronounced nonlinear properties, which are called varicaps. Some applications of varicaps are presented.

Card 1/3

Varicaps

SOV/2668

The author states that varicaps as yet have been insufficiently treated in the Soviet literature. He considers it important that varicaps, despite their many deficiencies which he lists, become better known to radio amateurs. This was the purpose of the present work. There are 12 Soviet and 3 non-Soviet references. No personalities are mentioned.

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JP/gmp  
12-18-59

VERBITSKAYA, T. N. (Cand. Tech. Sci.)

"Variconds [Seignetto-Ceramic Capacitors] and Their Applications"

(Use of Semiconductors in Instrument Making; Transactions of a Conference)  
Moscow, Mashiz, 1958. 258 p.

24.7900

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SOV/112-59-17-35827

Translation from: Referativnyy zhurnal. Elektrotehnika, 1959, Nr 17, p 13 (USSR)

AUTHOR: Verbitskaya, T.N.

TITLE: New Designs of Non-Linear Elements - Variconds - and Some Features of the Temperature Dependence of  $\epsilon$  in Ferroelectrics

PERIODICAL: V sb.: Fiz. dielektrikov, Moscow, AS USSR, 1958, pp 182-193. Diskus. p 210

ABSTRACT: Ferroceramic materials<sup>6</sup> on the base of  $\text{BaTiO}_3$  with addition of  $\text{SnO}_2$  can have  $\epsilon$  practically independent of the temperature within a certain temperature range. Such a dependence corresponds to a certain strength of the variable field. The presence of small changes of  $\epsilon$  at changes of temperature is connected with structural transformations below the Curie point. There are 3 references.

D.M.K.

Card 1/1

AUTHORS: Verbitskaya, T.N., Zhdanov, G.S., Venevtsev, Yu.N.  
and Solov'yev, S.P. 70-3-2-9/26

TITLE: Electrical and X-ray Investigations of the System  
 $\text{BaTiO}_3 - \text{BaZrO}_3$  (Elektricheskiye i rentgenograficheskiye  
issledovaniya sistemy  $\text{BaTiO}_3 - \text{BaZrO}_3$ )

PERIODICAL: Kristallografiya, 1958, Vol. 3, Nr 2, pp 186 - 196  
(USSR).

ABSTRACT: Various solid solutions of  $\text{BaTiO}_3 - \text{BaZrO}_3$  were  
prepared, having up to 30 mol% of the latter, by heating  
appropriate mixtures of  $\text{BaCO}_3$ ,  $\text{TiO}_2$  and  $\text{ZrO}_2$  at  $1400^\circ \pm 10^\circ\text{C}$ .  
The resulting materials were examined by the Debye-Scherrer  
method with a camera of diameter 11.4 cm and Cr or Cu radiation.  
With Cr radiation the lines 310 and 222 occur at a sufficiently  
high angle to give accurate cell dimensions. (For Cu radiation  
the appropriate lines are 501 and 431) The significance of  
the splitting of the lines under the distortions observed is  
explained. Dimensional measurements were made to  $\pm 0.001 \text{ \AA}$ ,  
monoclinic angle to  $\pm 1.5'$ , rhombohedral angle to  $\pm 1'$  and  
axial ratio to  $\pm 0.0005$ .

Card1/3 For the pure compounds the cell dimensions were found to be:-

Electrical and X-ray Investigations of the System  $\text{BaTiO}_3$  -  $\text{BaZrO}_3$  <sup>70-3-2-9/26</sup>

$\text{BaTiO}_3$ ,  $a = 3.990$ ,  $c = 4.027$ ,  $c/a = 1.0093$ ,  $V = 64.12$ ; and  $\text{BaZrO}_3$ ,  $a = 4.186$  and  $V = 73.35$ . From 0 to 2 mol% of zirconate the dimensions of the tetragonal phase approached each other slightly. From 2 to 6.5% the solid solution was pseudo-monoclinic with  $a = c$  and the monoclinic angle decreasing from  $90^\circ 08.5'$  to  $90^\circ 04.0'$ . From 6.5 to 20 mol%, the solution was rhombohedral with the rhombohedral angle equal to  $89^\circ 57'$  and increasing from 4.0177 to 4.0440. Above 20% the solution was cubic with an increasing from 4.0447 to 4.0616 at 30%. Over the whole range the volume of the unit cell increased linearly from 64.12 to 67.00  $\text{\AA}^3$  with no breaks at the phase transitions. In pure  $\text{BaTiO}_3$  three phase transitions (all with hysteresis) are observed on changing its temperature. They are at  $120^\circ$ ,  $0-5^\circ$  and  $-70$  to  $-80^\circ \text{C}$ . These transition points were measured for a range of compositions. Below 10% zirconate all four phases occur at appropriate temperatures, between 10 and 15% there is a confused region and above 15% only the cubic and rhombohedral phases occur. Measurements were also made of the dielectric constant of the material at various temperatures

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70-3-2-9/26

Electrical and X-ray Investigations of the System  $\text{BaTiO}_3$  -  $\text{BaZrO}_3$

and compositions.

The phase diagram constructed is like that found for  $\text{BaTiO}_3$  -  $\text{BaSnO}_3$  by Smolenskiy and Isupov (DAN, 1954, Vol 96, 53) and not like that drawn up by Kell and Hellicar (Akustika, 1956, Vol 6, Nr 2, p 232).

There are 8 figures, 2 tables and 26 references, 10 of which are Soviet, 2 German and 14 English.

ASSOCIATION: Fiziko-khimicheskiy institut im. L.Ya. Karpova  
(Karpov Physico-chemical Institute) and NII MRTF

SUBMITTED: July 18, 1957

Card 3/3

24(3)

AUTHORS:

Verbitskaya, T. N., Aleksandrova, L. M. SOV/48-82-12-32/33

TITLE:

Piezoelectric Ceramics With a Dielectric Constant up to 45 000  
(Segnetokeramika s dielektricheskoy prouitayemost'yu do 45 000)

PERIODICAL:

Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1958,  
Vol 22, No 12, Pt 1534-1536 (USSR)

ABSTRACT:

Polyocrystalline piezoelectric ceramics with high  $\epsilon$ -values is widely used for the manufacture of small condensers.  $\epsilon$  depends on temperature and the electric field tension. In order to obtain high  $\epsilon$ -values under normal conditions materials with a Curie ( $K$ point) point near room temperature or with distinctly marked nonlinear properties are produced. For any piezoelectric a corresponding field-tension value may be chosen at which  $\epsilon$  attains the maximum in one or another temperature range. In general, the higher  $\epsilon$  is, in the smaller temperature range it maintains this high value. With BaTiO<sub>3</sub> and T-7500  $\epsilon$  does not exceed, irrespective of any field tension change, the order of 10 000 at any point within the temperature range of +60 to -60°C. With VE-1  $\epsilon$  may attain, within this range, values up to 20 000 — 25 000 at optimum field tension. Among all kinds of

Card 1/2

Piezoelectric Ceramics With a Dielectric  
Constant up to 45 000

SOV/48-22-12-32/33

piezoelectric ceramics hitherto known the highest values  $\epsilon_{\max}$  (45000) were determined with VK-2, which is a new piezoelectric material. At given electric-field tension very high specific capacity values are attained for VK-2 samples in one or other temperature range by change of the dielectric thickness. Other VK-2 properties are not influenced in any way by high nonlinear or  $\epsilon$ -values. VK-2 is a good dielectric; in the large temperature range (100 $^{\circ}$ —500 $^{\circ}$ ) its volume resistivity is higher by one magnitude than with polycrystalline  $\text{BaTiO}_3$  (Fig 4). This material may be used for the manufacture of subminiature condensers as well as new "Varikond" (varikond) types that so far possess the most distinctly marked nonlinear properties. There are 4 figures.

Card 2/2

24 (2), 24 (4), 15 (2)

AUTHORS: Burakova, T. N., Verbitskaya, T. N. SOV/20-126-5-22/69

TITLE: Crystallo-optical Investigation of Polycrystalline Seignette Dielectrics Within the  $\text{BaTiO}_3$  -  $\text{ZrO}_2$  System (Kristalloopticheskiye izucheniya polikristallicheskikh segnetoelektrikov v sisteme  $\text{BaTiO}_3$  -  $\text{ZrO}_2$ )

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 126, Nr 5, pp 994 - 996 (USSR)

ABSTRACT: Barium titanate and solid solutions of Seignette dielectrics on this basis have found wide technical application in the form of polycrystalline ceramics. In the introduction the authors discuss these applications as well as the structure and the method of production of such ceramics. They investigated solid solutions of the  $\text{BaTiO}_3$  -  $\text{ZrO}_2$  system and report on the results obtained. They determined the type of relationship between the optical properties of the phase components and the chemical composition of the substance. All compositions under investigation consisted of several crystalline phases; a number of details concerning phase composition are discussed. Figure 1 shows, as an example, the dependence of the refractive index on the com-

Card 1/2

Crystallo-optical Investigation of Polycrystalline Seignette Dielectrics Within the  $\text{BaTiO}_3$  -  $\text{ZrO}_2$  System SOV/20-126-5-22/69

position of the system under investigation, i.e., both for the main and the intermediate phase (at room temperature). It results herefrom (as may also be seen from table 1) that the refractive index decreases with increasing  $\text{ZrO}_2$  content. There are 1 figure, 1 table, and 2 Soviet references.

PRESENTED: September 27, 1958, by A. F. Ioffe, Academician

SUBMITTED: September 27, 1958

Card 2/2

VERBITSKAYA, T. N.

## 8505/105

# WORK EXPLOITATION

— **И. В. В. Басинков, eds.**

Boгородskiy, I. P., and V. V. Pasyukov, *vest.*  
Soyuzovait po elektrotshicheskii materialam. V svyaz s tozham.  
2: Magnitnyye, pyroelektricheskiye, poluprovodnikovyye i drugie  
materialy (Handbook on Electrical Engineering Materials). In  
two volumes. Vol. 1: Magnetic, Conducting, Semiconductor, and  
Other Materials) Moscow, Gosenergoizdat, 1960. 511 p. Errata.

ally inserted. 30,000 copies printed.  
Eds. of Khar'kovskii K. A. Andrianov, N. P. Bogoroditskiy, (this  
Eds. of Khar'kovskii K. A. Andrianov, and A. M. Yuryev; Eds.:  
N. V. Koritskiy, V. V. Pasynkov, and V. V. Pasynkov; Tech. Ed.:  
Vol.): N. P. Bogoroditskiy and V. V. Pasynkov;  
Vol. II: N. P. Bogoroditskiy and V. V. Pasynkov;  
Vol. III: N. P. Bogoroditskiy and V. V. Pasynkov.

vol. 11. M. P. Bogdanov.  
Ya. M. Sobolev.

REMARK: This handbook is intended for technical personnel of electrical and radio engineering establishments, power stations and substations, electric repair shops, laboratories, and scientific research institutes. The handbook contains basic information about carbon.

chemical and radio engineering shops, laboratories, and  
institutions. The handbook contains basic information  
research institutes. of the handbook contains basic information  
CONTRACT. This volume is a metallic conductors electrical carbon,  
an magnetic materials used in modern ferroelectric, and  
and important electrical of semiconductor insulating the  
series characteristics. It does not include insulating the  
piezoelectric materials. It does not include insulating the  
materials, which are covered in Volume 2 of Dielectric insula-  
scientists associated with the Leningradsky electrotechnical  
scientists of the Leningradsky [Leningradsky] electrotechnical  
Scientific V. I. Ulyanova [Ulyanova (Lenin)], especially Ya. I. Panov,  
tute Institute V. I. Ulyanova [Ulyanova (Lenin)], especially Ya. I. Panov,  
Institute of Technical Sciences, and G. I. Pankovskiy and  
S. P. Voytekhnikov, assistants. References accompany each  
O. M. Kornov for their assistance. References accompany each  
part.

Handbook on Electrical Engineering (Cont.)

SOV/5058

PART IV. FERROELECTRIC AND PIEZOELECTRIC MATERIALS

Ch. XXVIII. Ferroelectric Materials (T. N. Verbitskaya)

1. General information on ferroelectric materials 410
2. Rochelle salt and related ferroelectric materials 411
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Ch. XXIX. Piezoelectric Materials (A. A. Tyulpanov)

1. Piezoelectric effect 432
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3. Polycrystalline piezoelectrics 439

Bibliography to Part IV [29 references: 26 Soviet, and 3 English]

443

Card-16/19





Verbitskaya, I. N.

ATTACHES: Ponomarev, P. T., Goplich, Ye. A., 8/155/10/005/04/025/02A  
 Martynov, K. I., Gilevskiy, V. I., 1007/0003  
 Verbitskaya, I. N., 7/1/000, I. D., Kanylov, V. Ye.,  
 Verbitskiy, M. M., Zhukovskiy, V. I., Lisler, K. Ye.,  
 Mikhaylov, M. M., Knyazev, T. G., et al.

TITLE: G. I. Skanavi

PERIODICAL: Elektrichestvo, 1960, Nr 4, p 74 (USSR)

TEXT: This is an obituary for Professor Ivanovich Skanavi, scientist in the field of physics of dielectrics, who died on November 11, 1959. He graduated from the fiziko-mekhanicheskiy fakul'tet Leningradskogo politekhnicheskogo instituta (Department of Physics and Mechanics of the Leningrad Polytechnic Institute), and then worked at the "Elektroella" Works in Leningrad. From 1955 to 1958 he worked at the Nauchno-issledovatel'skiy institut (Scientific Research Institute) as a team leader, and later as director of a scientific department. The mass production of ceramic radiotechnical capacitors was started in one of the works on his initiative and with his direct cooperation. He took his doctor's degree in 1946, and then became a professor. From 1940 until his death, he worked at the Fizicheskii Institut Akademii nauk SSSR (Physics Institute of the AS USSR), first under the direction of B. M. Vul,

Card 1/2

Corresponding Member of the AS USSR, and later independently as Director of the Laboratory of the Physics of Dielectrics. From 1950 to 1958 he wrote the book "Fizika dielektrikov" ("Physics of Dielectrics"). He organized the Second All-Union Conference on the Physics of Dielectrics in November 1959. During the last years of his life he was teaching physics at Moskovskiy universitet (Moscow University). He was Secretary of the PIAN Party Organisation. There is 1 figure.

Card 2/2

S/105/60/000/08/14/023  
B012/B058

AUTHOR: Verbitskaya, T. N., Candidate of Technical Sciences

TITLE: 6 The Electric Properties and Applications of Types  
BK-2 (VK-2), BK-3 (VK-3), BK-4 (VK-4) Seignette Ceramics ✓  
and "Varicondas"

PERIODICAL: Elektrichestvo, 1960, No. 8, pp. 68 - 75

TEXT: The electric properties of the first seignette ceramic material which was designated BK-1 (VK-1), as well as the properties of the "variconda" made of it are dealt with in the papers (Refs. 1, 2). The characteristics, which bring to light the positive and negative sides of the nonlinear seignette ceramic elements of the BK-1 (VK-1) material, were determined at the production of circuits, instruments and appliances with "varicondas". They are shown here. The great group of new seignette ceramics discovered by G. A. Smolenskiy is mentioned in this connection (Ref. 3). The idea of capacitive machines by F. Ollendorf (Ref. 4) which was later developed by A. Ye. Kaplyanskiy (Ref. 5), is pointed out. Further new materials have been developed, i. e. BK-2

Card 1/4

✓C

The Electric Properties and Applications  
of Types BK-2 (VK-2), BK-3 (VK-3), BK-4  
(VK-4) Seignette Ceramics and "Varicondas"

S/105/60/000/08/14/023  
B012/B058

(VK-2), BK-3 (VK-3) and BK-4 (VK-4). The electric properties of these materials are described here. BK-2 (VK-2) shows a greater nonlinearity and greater dielectric losses than BK-1 (VK-1). The "varicondas" of BK-3 (VK-3) are being developed for operation at room temperature. This material shows a high nonlinearity, under simultaneous application of a weak alternating field and the influence of a constant control field. BK-4 (VK-4) differs from the first 3 materials by a higher stability of the main parameters at temperature changes. Experimental samples of the material BK-5 (VK-5) with a maximum dielectric constant of 80,000 - 100,000 and nonlinearity coefficient of 35 - 40 have already been manufactured. The characteristics of the "varicondas" of BK-2 (VK-2) are given here. 9 types are manufactured at present. The data of these "varicondas" are shown in a table. A compilation of the use of "varicondas" is given next. I. E. Berinberg (Ref. 14) investigated the problem of the use of "varicondas" as shunt for the inductivity in the production of spark-free mining systems. I. F. Borodin (Ref. 15) developed a series of systems in which "varicondas" serve as voltage-, temperature- and time relays in automatic electric power stations in the

Card 2/4

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The Electric Properties and Applications  
of Types BK-2 (VK-2), BK-3 (VK-3), BK-4  
(VK-4) Seignette Ceramics and "Varicondas"

S/105/60/000/08/14/023  
B012/B058

country. N. L. Khudobko (Ref. 16) came to the conclusion that the differential circuit of a dielectric d.c. power amplifier is the most useful of all existing circuits for the practical use in follower systems. F. F. Galteyev jointly with the author investigated circuits for voltage stabilization in synchronous generators with excitation by permanent magnets with "varicondas". D. M. Kazarnovskiy and B. N. Feofanov produced a three-phase frequency doubler. V. P. Sidorenko (Ref. 17) made an analytical calculation of a frequency tripler. B. V. Kol'tsov repeatedly showed that simple impulse generators can be produced with the aid of "varicondas". B. V. Kol'tsov investigated the circuits of the dielectric peak generators and formulated (Ref. 18) the technical demands on "varicondas". N. F. Klochkov proposed to use the "varicondas" for the electric tuning of oscillation circuits. V. M. Pluzhnikov (Ref. 19) investigated numerous possibilities of the use (in static and dynamic circuits) of various "varicondas". O. N. Lebedev and the author developed further the studies by Yu. S. Volkov (Ref. 20) and V. M. Pluzhnikov and produced a number of new circuits of relaxation generators.

Card 3/4

✓C

The Electric Properties and Applications  
of Types BK-2 (VK-2), BK-3 (VK-3), BK-4  
(VK-4) Seignette Ceramics and "Varicondas"

S/105/60/000/08/14/023  
B012/B058

There are 9 figures, 1 table, and 20 references: 19 Soviet and 1 German.

SUBMITTED: February 19, 1960

Card 4/4

✓c

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9.2110(1385,1043,1153)

S/048/60/024/010/029/033  
B013/B063

AUTHORS: Verbitskaya, T. N., Aleksandrova, L. M., and Sinitsyna, L. S.

TITLE: Provisional Communication on Piezoceramic Materials<sup>1)</sup> With a Dielectric Constant of 80,000  $\div$  100,000

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960, Vol. 24, No. 10, pp. 1291-1293

TEXT: A new substance, designated as BK-5 (VK-5), with very high  $\epsilon$ -values,  $\epsilon_{\max} = (80,000 \div 100,000)$  has been developed. The basic characteristics, measured at room temperature, of piezoceramic materials ( $\epsilon_{\text{initial}}$ ,  $\epsilon_{\max}$ , and  $E_{\max}$ ) were compared with the corresponding characteristics of barium titanate. It may be seen from Fig. 1 that the degree of nonlinearity rises noticeably on a regular transition of barium titanate to VK-1, VK-2, and VK-5. VK-5 exhibits nonlinear properties in a wide temperature range. On a temperature drop from room temperature down to  $-140 \div -150^{\circ}\text{C}$  the nonlinearity coefficient becomes considerably larger

Card 1/3

85020

Provisional Communication on Piezoceramic  
Materials With a Dielectric Constant of  
 $80,000 \div 100,000$

S/048/60/024/010/029/033  
B013/B063

(from  $40 \div 50$  to  $320 \div 360$ ). An increase of  $K_{\sim}$ , caused in the range of negative temperatures chiefly by a noticeable decrease of the initial  $\epsilon$ -value, takes place with VK-2 and barium titanate as well. The quantity  $E_{\max}$  becomes a little larger with a temperature drop, and becomes smaller on a temperature rise above room temperature. Proceeding from this fact, the authors determined  $K_{\sim}$  with the aid of a corresponding  $E_{\max}$  value at different temperatures. In the investigation of the temperature dependence of  $\epsilon$  in fields with different field strengths, four maxima of the dielectric constant were ascertained. These maxima are specially marked at a field strength of  $60 \div 100 \text{ v mm}^{-1}$ . In this case,  $\epsilon$  attains about 80,000. A definite relationship was found between the nonlinearity and the coefficient of orthogonality (koeffitsient pryamougol'nosti)  $K_{\text{hyst}}$ .

The higher the  $K_{\sim}$ , the higher will be  $K_{\text{hyst}}$ . (Figs. 2 and 3). Not even in VK-5,  $K_{\text{hyst}}$  at room temperature even exceeds  $60 \div 65\%$ , whereas it rises up to 80% at extremely low temperatures. The present paper was read at the

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85020

Provisional Communication on Piezoceramic  
Materials With a Dielectric Constant of  
80,000  $\div$  100,000

S/048/60/024/010/029/033  
E013/B063

Third Conference on Piezoelectricity, which took place in Moscow from  
January 25 to 30, 1960. There are 3 figures, 1 table, and 3 references:  
2 Soviet and 1 German.

X

Card 3/3



ISMAILZADE, I.G.; VERBITSKAYA, T.N.; NESTERENKO, V.I.

Preliminary data on the X-ray diffraction study of VK-3  
ferroelectric ceramics in constant electric fields.

Kristallografiia 9 no.3:412-413 My-Je '64.

(MIRA 17:6)

1. Institut neftekhimicheskikh protsensov imeni Yu.G.  
Mamedaliyeva AN Azerbaydzhanskoy SSR.

S/0070/EA/009/003/0412/0413

ACCESSION NR: AP4039401

AUTHORS: Ismailzade, I. G.; Verbitskaya, T. N.; Nesterenko, V. I.

TITLE: Preliminary data on the x-ray investigation of VK-3 ferroelectric ceramic in steady electrical fields

SOURCE: Kristallografiya, v. 9, no. 3, 1964, 412-413

TOPIC TAGS: x ray diffraction, VK 3 ferroelectric ceramic, electric field

ABSTRACT: The results of a study on the effect of a steady electrical field on the diffraction pattern of VK-3 are presented. At room temperature the material is cubic, like perovskite ( $a = 4.006 \pm 0.002 \text{ \AA}$ ), with a Curie point of about 20C. Its properties are markedly nonlinear in a steady electrical field. Each maximum was measured in sequence: first in the electrical field, next with the field removed, then with the field restored, and lastly with the field again removed. No displacement of diffraction maxima was observed, which agrees with the work of Yu. N. Venevtsev, A. G. Kapy\*shev, G. S. Zhdanov, and T. N. Verbitskaya (Tezisy\* dokladov tret'yego soveshchaniya po segnetoelektrichestvu, 1960, p. 14). However, the intensity of the maxima was observed to diminish sharply in the steady electrical field. This fact was not noted in the work cited. At any particular voltage the

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ACCESSION NR: AP4039401

maximum of  $321\alpha$  decreases more markedly than that of  $200\alpha$ . Results show that the nonlinear properties of VK-3 in steady electrical fields on the order of 3.8-6.6 kg/cm are associated not with changes in symmetry of the lattice but probably with deformation of the electron clouds of the ions, which leads to a diminution in the intensity of individual maxima. Orig. art. has 2 figures.

ASSOCIATION: Institut neftekhimicheskikh protsessov im. Yu. G. Mamedaliyeva, AN AzerbSSR (Institute of Petroleum-Chemical Processes AN AzerbSSR)

SUBMITTED: 11Aug62

SUB CODE: SS, MT, OP

NO REF SOV: 003

ENCL: 00

OTHER: 002

Card 2/2



L 7852-66

ACC NR: AP5028120

increasing titanium content. The refractive index 2.50 was obtained for  $\text{PbZrO}_3$ ; this does not agree with the value 2.30 found by F.Jona, G.Shirane, and R.Pepinsky (Phys. Rev., 97, 1584 (1955)).  $\text{PbSnO}_3$  was not formed.  $\text{Pb}_2\text{SiO}_4$  was stable between 750 and 1050°C, but at higher temperatures it decomposed into cassiterite and a new phase of unknown composition consisting of yellow biaxial bar-shaped crystals several microns long having regular elongation and the optical properties  $n_x = 2.38$ ,  $n_y = 2.35$ ,  $n_z = 2.32$ . Single phase materials were not obtained at  $\text{PbSiO}_3$  concentrations above about 50 mol. % at 750 mole percent of the  $\text{PbTiO}_3$ ,  $\text{PbZrO}_3$ ,  $\text{PbSnO}_3$ ,  $\text{Pb}_2\text{SiO}_4$ ,  $\text{Pb}_2\text{GeO}_4$ , and  $\text{Pb}_2\text{ZnO}_4$  phases. The appearance and other characteristics of the crystallites of both the single and the polyphase materials are described at some length. The crystallo optical investigations confirm the available x-ray data on the formation of solid solutions in the investigated system. Orig. art. has: 2 figures and 1 table.

SUB CODE: SS, OP

SUBM DATE: 00/

ORIG. REF: 006

OTH. REF: 002

Card 2/2

VERBITSKAYA, T.N.; SYRKIN, L.N.; EL'GARD, A.M.

Effect of pressure and a constant electric field on the  
nonlinear properties of variable capacitors. Izv. AN SSSR.  
Ser. fiz. 29 no.11:2096-2100 N '55. (MIRA 18:11)

L 0000-66  
ACC NR: AP5028131

SOURCE CODE: UR/0048/65/029/011/2104/2106

AUTHOR: Verbitskaya, T. N.; Aleksandrova, L. M.; Shirobokova, Ye. I.

ORG: none

TITLE: Electric properties of "Varikond" films with square hysteresis loops /Report, Fourth All-Union Conference on Ferro-electricity held at Rostov-on-the Don 12-16 September 1964/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 29, no. 11, 1965, 2104-2106

TOPIC TAGS: ferroelectric material, ceramic material, ceramic film, Curie point, dielectric constant, nonlinear effect, electric polarization, hysteresis loop

ABSTRACT: In an effort to obtain a ferroelectric ceramic with a highly nonlinear dielectric constant and a nearly rectangular dielectric hysteresis loop, the authors have investigated materials with a nearly cubic rhombohedral perovskite structure and have synthesized by undisclosed techniques a (possibly barium titanate base) ceramic of undisclosed composition with they call "VK-1" and which has the following properties. Curie point, about 200°C, coercive field, 5-7 kV/cm, total polarization, 18-20  $\mu\text{C cm}^{-2}$ ; resistivity,  $10^{12}$  ohm cm at 100°C, nonlinearity factor (ratio of maximum to low-field dielectric constant), 20-50; and hysteresis loop squareness ratio (T.N. Verbitskaya, L.M.Aleksandrova, and L.S.Sinitsyna, Izv. AN SSSR. Ser. fiz., 24, No. 10, 1291 (1960)), 0.85-0.94. Disadvantages of this material are its high coercive and

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L 7832-66

ACC NR: AP5028131

control fields. In an effort to eliminate these disadvantages, thin (5 to 100  $\mu$ ) films of VK-6 were produced by an undisclosed technique and their ferroelectric properties were investigated. The Curie points, weak-field dielectric constants, squareness ratios, and saturation polarizations were approximately the same for the thin films as for the bulk material. The maximum dielectric constant was reduced from  $2 \times 10^4$  for the bulk material to  $10^4$  for the 5-10  $\mu$  films, and the nonlinearity factor was therefore correspondingly reduced. The potential at which the dielectric constant was maximum, however, was reduced from 250 V for the bulk material to 10-20 V for the 5-10  $\mu$  films, and the saturation voltage was reduced from 600-800 V to 60-100 V. The pulse amplitude controlling switching was 30-60 V for the 10  $\mu$  films, and the switching time on a 10 ohm line was 0.3-0.7  $\mu$  sec. It is concluded that thin films of VK-6 can be produced which retain the high nonlinearity and hysteresis loop rectangularity of the bulk material and have considerably reduced controlling and switching voltages. Orig. art. has: 3 figures and 1 table.

SUB CODE: SS, EM

SUBM. DATE: 00/

ORIG. REF: 003 OTH REF: 002

Card 2/2 <sup>5/10</sup>



L 10735-66 EWT(1)/EWP(e)/EWT(m)/EWP(b) IJP(c) GG/WH

ACC NR: AP5028129

5 UNCE CODE: UR/0048/65/029/011/2094/2100

AUTHOR: Verbitskaya, T.N.; Syrkin, L.N.; El'gard, A.M.

ORG: none

TITLE: Influence of pressure and a static electric field on the nonlinear properties of varicaps /Report, Fourth All-Union Conference on Ferroelectricity held at Rostov-on-the Don 12-18 September, 1964/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 29, no. 11, 1965, 2096-2100

TOPIC TAGS: ferroelectricity, ferroelectric material, compressive stress, electric field, dielectric constant, nonlinear effect

ABSTRACT: The dielectric constants of VK-2 varicaps subjected to different preliminary treatments were measured at frequencies from 50 cps to 300 kc with field strengths up to 4-5 kV/cm in the presence of dc bias fields up to 5 kV/cm or under uniaxial compression up to 1000 kg/cm<sup>2</sup>. The results are presented graphically and are compared with similar data for BaTiO<sub>3</sub>. The measurements that did not involve compression were made with 0.1 mm thick varicap films (low-field capacity approximately 12 pF) using 100 ns pulses at a repetition rate of 2 pps. For the measurements made under compression, cubic samples 5 mm on a side were employed. The preliminary treatments included natural aging, heating at 400°C for 1 hour followed by rapid cooling, or cooling from slightly below the Curie point in the presence of a strong (up to 5 kV/cm)

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L 10735-66

ACC NP. AP5028129

ac or dc electric field, and application of a strong ac or dc field at room temperature. Heat treatment enhanced the nonlinear dielectric properties of the specimens, i.e., it increased the dependence of the dielectric constant on the strength of the measuring field, increased the nonlinearity coefficient  $K$  (the ratio of the maximum value to the low-field value of the dielectric constant), and decreased the intensity of the measuring field at which the dielectric constant attained its maximum. Heat treatment in an ac field resulted in even more pronounced nonlinearity than did ordinary heat treatment alone. Preliminary treatment at room temperature with a strong electric field also increased the nonlinearity of naturally aged samples, but it reduced the nonlinearity of previously heat-treated samples, owing to formation of a piezoelectric texture. The dependence of the dielectric constant on the measuring field strength became less marked as the frequency increases, while  $\bar{\epsilon}_{\max}$  increased and the nonlinearity coefficient  $K$  decreased. The nonlinear dielectric properties of the specimens also became less marked when the dc bias field was increased. Application of mechanical compression reduced the dependence on the measuring field strength of the dielectric constant in the direction of the compression, and also reduced the field dependence of the tangent of the dielectric loss angle. This is ascribed to orientation of the domain walls perpendicular to the compression axis. The nonlinearity diminished to approximately the same extent with an increase of frequency from 50 cps to 300 kc as with an increase of bias from 0 to 3.2 kV/cm or an increase of compression from 0 to 1000 kg/cm<sup>2</sup>. Orig. art. has 4 figures.

SUB CODE:

091

SUM DATE: 00/

ORIG REF: 008/

OTH REF: 002

ATD PRESS:

4164

Card 2/2

SOBOLEV, Gleb Alekseyevich; TARASOV, S.V., kand. tekhn. nauk,  
retsenzent; VERBITSKAYA, Ye.M., red.

[Arrangement, maintenance, repair and adjustment of spreading, drawing and roving machines in the flax industry]  
Ustroistvo, obsluzhivanie, remont i naladka raskladochnykh,  
lentochnykh i rovnichnykh mashin l'nianoi promyshlennosti.  
Moskva, Legkaia industriia, 1965. 174 p. (MIRA 18:10)

VORONOV, Gennadiy Alekseyevich; KORNEYEV, Ye.F., retsenzent;  
VERBITSKAYA, Ye.M., red.

[Modernization of the ShB-140 sizing machines] Moderniza-  
tsiia shlikhtoval'nykh mashin ShB-140. Moskva, Legkaya  
industriia, 1965. 20 p. (MIRA 18:3)

NEMKOVSKIY, Semen Petrovich; SMIRNOV, N.G., inzh., retsenzent;  
VERBITSKAYA, Ye.M., red.

[Equipment for mechanical preparation of cotton fabrics for  
printing] Oborudovanie dlia mekhanicheskoi podgotovki khlop-  
chatobumazhnykh tkanei k pechataniu. Moskva, legkaia in-  
dustriia, 1965. 31 p. (MIRA 18:3)

DENISOV, Vladimir Ivanovich; ISAKOVA, Lyubov' Fedorovna;  
VERBITSKAYA, Ye.K., red.

[Experience of the "Trekhgornaya Textile Works" reducing breakage in spinning] Opyt snizheniia obryvnosti v priadil'nom proizvodstve kombinata "Trekhgornaya manufaktura" imeni Dzerzhinskogo. Moskva, Gizlegprom, 1961. 53 p. (MIRA 17:7)

GOLOMB, Leonid Mikhaylovich; YEREM'YANOV, A.G., retsenzent;  
RODRIAN, I.V., retsenzent; VERBITSKAYA, Ye.M., red.

[Physicochemical fundamentals of the final operations in  
dyeing with vat dyes] Fiziko-khimicheskie osnovy zakliu-  
chitel'nykh operatsii krasheniia kubovymi krasiteliami.  
Moskva, Legkaia industriia, 1964. 153 p. (MIRA 17:9)

ANDROSOV, Viktor Fedorovich; DUBROVSKAYA, A.I., redsont;  
ROGOVA, I.V., redsont; VERBITSKAYA, Ye.M., red.

[Dyeing of polyamide fibers] Krashenie poliamidnykh  
volokon. Moskva, Izd-vo "Legkaia Industriia," 1964.  
207 p. (MIRA 17:6)



LIPSHITS, Naum Veniaminovich; MOTALYGA, Aleksandr Yegorovich;  
MUKHANOV, P.Ya., retsenzent; VERBITSKAYA, Ye.M., red.;  
VINOGRADOVA, G.A., tekhn. red.

[Automatic looms for the woolen and worsted industry]  
Avtomaticheskie tkatskie stanki dlia sherstianoi pro-  
nyshlennosti. Moskva, Gizlegprom, 1963. 230 p.  
(MIRA 17:3)

KON'KOV, Aleksey Ivanovich; ZIL'DIN, Yuliy Rafailovich; KURGIN,  
Yuriy Mikhaylovich; KOZLOVSKIY, Sergey Dmitriyevich;  
KON'KOVA, Mariya Borisovna; TUBALOV, Konstantin  
Dmitriyevich; KILCHIKOV, I.I., retsenzent; ABRAMOV, S.A.,  
retsenzent; ZELENSKIYA, G.G., retsenzent; GIBERTSEV, S.I.,  
retsenzent; VERBITSKIY, Ye.M., red.

[Equipment for the finishing operations in the textile  
industry] Oboorudovanie otdeichnogo proizvodstva tekstil'  
noi promyshlennosti. Moskva, legkaya industriya, 1964.  
417 p. (MIRA 18:1)

STEPANOV, Andrey Sergeyevich; SHUB, L.S., retsenzent; MORYGANOV, P.V., retsenzent; VERBITSKAYA, Ye.M., red.

[Development of technology of the finishing of cotton, linen and rayon fabrics] Razvitie tekhnologii otdelki khlopchatobumazhnykh, l'nianyykh i viskoznykh tkaney. Moskva, Legkaya industriya, 1965. 267 p. (MIRA 18:7)

DEMINA, Natal'ya Vasil'yevna; MOTORINA, Aleksandra Vasil'yevna;  
NOVIKOV, Nikolay Alekseyevich, kand. tekhn. nauk;  
NOVIKOVA, Sof'ya Aleksandrovna; NEMCHENKO, Eleonora  
Adol'fovna, kand. tekhn. nauk; PANFILOVA, Mariya  
Mikhaylovna; ROGOVINA, Alisa Aleksandrovna, kand. tekhn.  
nauk; ROMANOVA, Lyubov' Stepanovna; TALYZIN, M.D., kand.  
tekhn. nauk, retsenzent; VERBITSKAYA, Ye.M., red.

[Methods of physicommechanical testing of synthetic fibers,  
threads and films] Metody fiziko-mekhanicheskikh ispytanii  
khimicheskikh volokon, nitel i plenok. Moskva, Legkaia  
industriia, 1964. 352 p. (MIRA 18:1)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut iskus-  
stvennykh volokon (for all except Talyzin, Verbitskaya).